CLAIMS

1. A method for estimating a saturated polarization voltage drop that occurs at a battery when a maximum current continuously flows at high rate discharge, characterized by the steps of: measuring a discharge current and a terminal voltage at high rate discharge; finding an approximation formula expressing the polarization voltage drop corresponding to the increasing discharge current at high rate discharge according to the measured discharge current and the terminal voltage; finding a maximum polarization voltage drop and a discharge current corresponding to the maximum polarization voltage drop according to the approximation formula; computing a quotient by dividing the maximum polarization voltage drop by the discharge current corresponding to the maximum polarization voltage drop; computing a product by multiplying the quotient by the maximum current; computing a sum by adding the product to the polarization voltage drop corresponding to the maximum current according to the approximation formula; and regarding the sum as the saturated polarization voltage drop.

2. The method for estimating the saturated polarization voltage drop as claimed in claim 1, characterized by the steps of finding an approximation formula expressing the terminal voltage corresponding to the increasing discharge current at high rate discharge according to the measured discharge current and the measured terminal voltage; making an approximation formula expressing the polarization voltage drop corresponding to the increasing discharge current at high rate discharge by subtracting a voltage drop owing to pure resistance of the battery from the approximation formula expressing the terminal voltage.

3. An apparatus for estimating saturated polarization voltage drops that occurs at a battery when a maximum current at high rate discharge continuously flows, said apparatus including: a measuring device for measuring the discharge current and the terminal voltage at high rate discharge; a finding

5   device for finding an approximation formula expressing the polarization voltage drop corresponding to the increasing discharge current according to the measured discharge current and the measured terminal voltage; and an estimating device for estimating the saturated polarization voltage drop by the steps of: finding a maximum polarization voltage drop and a discharge current

10   corresponding to the maximum polarization voltage drop according to the approximation formula; computing a quotient by dividing the maximum polarization voltage drop by the discharge current corresponding to the maximum polarization voltage drop; computing a product by multiplying the quotient by the maximum current; computing a sum by adding the product to

15   the polarization voltage drop corresponding to the maximum current according to the approximation formula; and regarding the sum as the saturated polarization voltage drop.

4. A method for estimating residual discharge capacity of a battery including the step of estimating the residual discharge capacity for allowing the

20   maximum current to continuously flow according to the difference between an open circuit voltage at the beginning of high rate discharge, and a voltage drop owing to internal resistance including the saturated polarization voltage drop estimated by the method according to claims 1 and 2.